

Electrochemical Peroxide Generation, Phase I

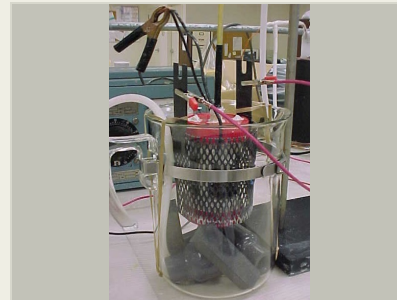
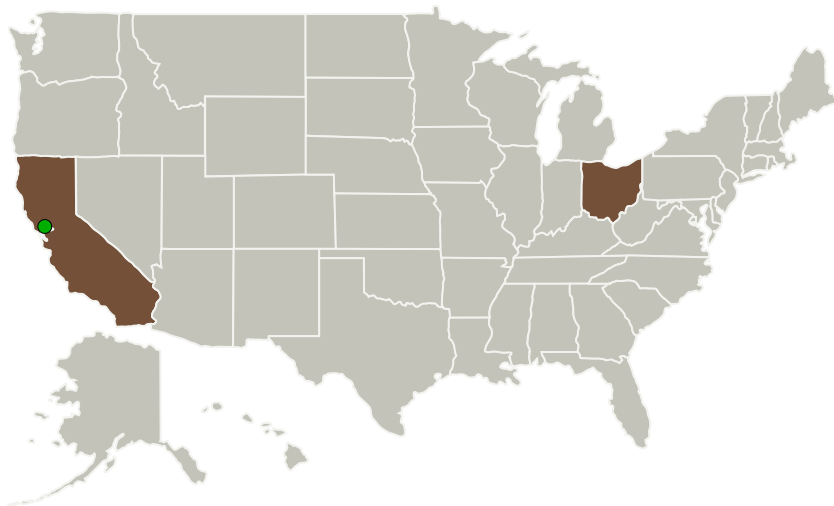
Completed Technology Project (2016 - 2016)



Project Introduction

In this Phase I SBIR program, Faraday will develop a custom bench-scale electrochemical cell incorporating state of the art electrocatalysts in a gas-diffusion electrode (GDE) system to serve as proof-of-concept of the suitability of an electrochemical system for in situ hydrogen peroxide generation, to serve as a disinfectant solution for crew contact surfaces in space vehicles. Hydrogen peroxide is an appealing disinfectant due to its low toxicity and innocuous decomposition products (i.e., water and oxygen). Faraday will construct a bench-scale electroreactor to incorporate a custom-fabricated gas diffusion cathode and a commercial mixed-metal oxide anode, which will then be used in hydrogen peroxide generation tests. Adventitious hydrogen peroxide consumption at the anode will be avoided by inclusion of a selective membrane between the anode and cathode compartments. The performance of this electrochemical generation system will be enhanced through application of the FARADAYIC Process, which involves precise tuning of pulsed electrical potentials applied to the catalytic electrodes. The system will be characterized by the peroxide generation rate, the maximum achievable peroxide concentration, and the microbial disinfection capability demonstrated by the solutions generated. These efforts will provide a platform for scale-up and optimization efforts in Phase II and transition to commercialization in Phase III.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Faraday Technology, Inc	Lead Organization	Industry	Clayton, Ohio
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Ohio

Project Transitions

**June 2016:** Project Start**December 2016:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/139585>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Faraday Technology, Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

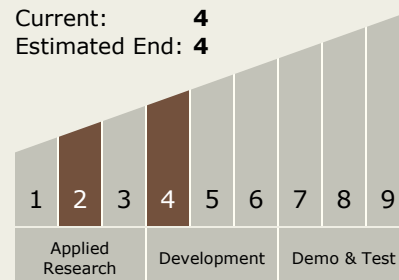
Carlos Torrez

Principal Investigator:

E. Jennings Taylor

Technology Maturity (TRL)

Start: 2
 Current: 4
 Estimated End: 4

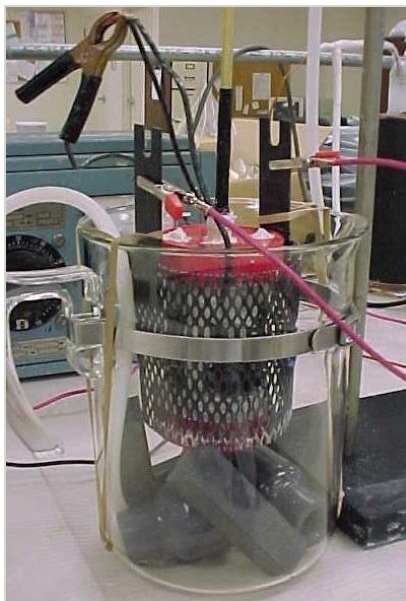


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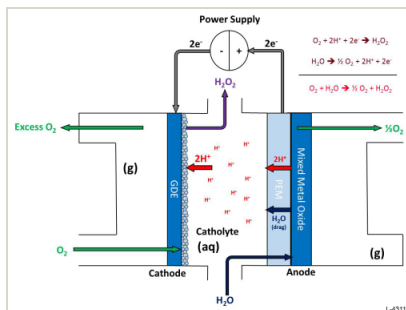
Images



Briefing Chart Image

Electrochemical Peroxide
Generation, Phase I

(<https://techport.nasa.gov/image/126889>)



Final Summary Chart Image

Electrochemical Peroxide
Generation, Phase I Project Image
(<https://techport.nasa.gov/image/132076>)

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
 - └ TX06.1.4 Habitation Systems

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System